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(54) PRODUCTION OF SILICONE ELASTOMER

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a silicone elastomer that can exhibit its usefulness in the treatment of human hair, skin and armpits by allowing a $\equiv\text{SiH}$ -containing siloxane to crosslink with an unsaturated hydrocarbon silicon in the presence of low-molecular-weight siloxane fluid.

SOLUTION: In the presence of a platinum catalyst, (A) a $\equiv\text{Si-H}$ -containing siloxane is allowed to react with (B) a monoalkenyl polyether until a polyether group-bearing $\equiv\text{Si-H}$ -containing siloxane is formed. Then, (C) the polyether group-bearing $\equiv\text{Si-H}$ -containing siloxane and (D) an unsaturated hydrocarbon, for example, α,ω -diene are allowed to react with each other (E) in the presence of a platinum catalyst in a solvent until a silicone elastomer is produced by adding $\equiv\text{Si-H}$ to the double bonds of the α,ω -diene by crossing. The molar ratio of the polyether to $\equiv\text{SiH}$ group in the $\equiv\text{SiH}$ siloxane is preferably 0-1.

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CLAIMS

[Claim(s)]

[Claim 1] (A) formula: $\text{--- R}_3 \text{SiO}(\text{R}'_2\text{SiO})_a \text{bSiR}(\text{R}''\text{HSiO})_3$ or formula: $(\text{R}'_2\text{SiO}) \text{--- a b}(\text{R}''\text{HSiO})$ **Si-H content polysiloxane expressed --- and arbitration --- formula: --- **Si-H content polysiloxane (the inside of said formula, and R ---) expressed by **Si-H content polysiloxane or formula: $\text{HR}_2 \text{SiO}(\text{R}'_2\text{SiO})_a \text{b SiR}(\text{R}''\text{HSiO})_2 \text{H}$ expressed by $\text{HR}_2 \text{SiO}(\text{R}'_2\text{SiO})_c \text{SiR}_2 \text{H R}'$ And R' is the alkyl group of the carbon atomic numbers 1-6, and a is [the value of 1-250 and c of the value of 0-250 and b] the values of 0-250. ; and (B) type: $\text{--- CH}_2 = \text{CH}(\text{CH}_2)_x \text{O}(\text{CH}_2 \text{CH}_2 \text{O})_y \text{z T}(\text{CH}_2 \text{CH}_3 \text{CHO})$ or formula: $\text{--- CH}_2 = \text{CH-Q-O}(\text{CH}_2 \text{CH}_2 \text{O})_y \text{z T}(\text{CH}_2 \text{CH}_3 \text{CHO})$ (the inside of said formula, and T --- hydrogen ---) Although it is C1 - C10 alkyl group, an aryl group, or C1 - C20 acyl group, Q is a bivalence connection radical containing partial saturation, x is the value of 1-6, y is the value of 0, or 1-100 and z is the value of 0, or 1-100 it is contingent [on both y and z being 0]. Mono-alkenyl polyether; expressed Under existence of a platinum catalyst, **Si-H content polysiloxane; and (D) type: $\text{CH}_2 = \text{CH}(\text{CH}_2)_x \text{CH} = \text{CH}_2$ which have process; and the (C) aforementioned polyether radical which are made to react until **Si-H content polysiloxane which has a polyether radical is formed alpha, omega-diene which are expressed, Formula: alpha expressed by alpha [which is expressed by $\text{CH**C}(\text{CH}_2)_x \text{C**CH}$], omega-gene, and formula: $\text{CH}_2 = \text{CH}(\text{CH}_2)_x \text{C**CH}$, omega-en-Inn (x are the value of 1-20 among said formula.) It is (i) until a silicone elastomer is formed, when the double bond or triple bond in (E) unsaturated hydrocarbon is crossed and **SiH constructs for it a bridge and adds;. Organic compound, (ii) Compound containing a silicon atom (iii), mixture of an organic compound, (iv) Mixture of a compound and (v) containing a silicon atom The manufacture approach of the silicone elastomer which comes to contain process; made to react under existence of the solvent chosen from the mixture of an organic compound and the compound containing a silicon atom and a platinum catalyst.

[Claim 2] The approach according to claim 1 of including further the process which shears said solvent and said silicone elastomer until the process and silicone paste which add the solvent of the amount of additions to a silicone elastomer are formed.

[Claim 3] The approach according to claim 2 of including further the process which shears water and said silicone paste until the process and silicone emulsion which add water to a silicone paste are formed.

[Claim 4] as the reactant of an addition of the 2nd process --- (F) type: $\text{--- R}_3 \text{SiO}(\text{R}'_2\text{SiO})_a \text{b SiR}(\text{R}''\text{HSiO})_3$ or formula: $(\text{R}'_2\text{SiO}) \text{--- a b}(\text{R}''\text{HSiO})$ **Si-H content polysiloxane expressed --- and arbitration --- formula: --- **Si-H content polysiloxane (the inside of said formula, and R ---) expressed by **Si-H content polysiloxane or formula: $\text{HR}_2 \text{SiO}(\text{R}'_2\text{SiO})_a \text{b SiR}(\text{R}''\text{HSiO})_2 \text{H}$ expressed by $\text{HR}_2 \text{SiO}(\text{R}'_2\text{SiO})_c \text{SiR}_2 \text{H R}'$ And R' is the alkyl group of the carbon atomic numbers 1-6, a is the value of 0-250, b is the value of 1-250, and c is the value of 0-250. The approach according to claim 1 of including.

[Claim 5] How to process the bottom of hair including applying the silicone elastomer obtained by the approach according to claim 1, 2, or 3 to the bottom of hair, the skin, or **, the skin, or **.

[Claim 6] How to provide with a barrier film the front face of a base material including

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is the silicone elastomer swollen in silicone gel and a silicone paste, and relates to the thickened low-molecular-weight siloxane fluid or solvent in the gestalt of the silicone elastomer which can form a silicone emulsion.

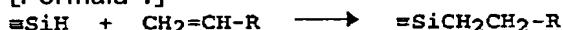
[0002]

[Description of the Prior Art] A crosslinking bond is association of the polymer chain in three-dimension network structure. Bridge formation can be regarded very much as many long-chain branching, so that continuous insoluble network structure or gel is formed.

[0003] In order to form network structure, the hydrosilylation reaction by which a catalyst is carried out with platinum has been used increasingly. Typically, the hydrosilylation reaction by which a catalyst is carried out with platinum is accompanied by the reaction between the amount siloxane of macromolecules containing the reaction or some **Si-H radicals between the low-molecular-weight siloxane containing some **Si-H radicals, and the amount siloxane of macromolecules containing some **Si-vinyl groups, and the low-molecular-weight siloxane containing some **Si-vinyl groups.

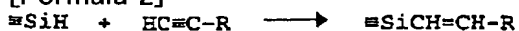
[0004] the attractive description of this device — (i) a by-product's not being formed and (ii) bridge formation part are specified strictly, and so the configuration of network structure is defined strictly — and (iii) It is hydrosilylation advancing and forming network structure also at a room temperature. It is the addition of **SiH which bridge formation intersects in a double bond in this device, [0005]. [i.e.,]

[Formula 1]



[0006] The addition of **SiH which crosses a triple bond with the addition which is alike and is expressed more, i.e., [0007]

[Formula 2]



[0008] It is accompanied by the addition which is alike and is expressed more.

[0009] Although we were this device, we were able to blend the new product which has a new and peculiar property and a new application by using the improved peculiar thing of some of this device which is not clear. Especially one peculiar side face is being able to form an emulsion, without needing a surface active agent using the silicone paste concerning this invention. This may be very worthy in the personal care (personal care) field from which the susceptibility of the skin becomes a problem, when a specific surfactant exists.

[0010]

[Embodiment of the Invention] This invention relates to the approach of manufacturing a silicone elastomer according to the 1st process to which a (A) **Si-H content polysiloxane and (B) mono-alkenyl polyether are made reacting under existence of a platinum catalyst until **Si-H content siloxane which has a polyether radical is formed. Unsaturated hydrocarbon like **Si-H content siloxane which has said polyether radical, (C) (D) alpha, and omega-diene is made to

react under existence of the (E) solvent and a platinum catalyst in the 2nd process until a silicone elastomer is formed, when it crosses and SiH constructs for it a bridge and adds the double bond in alpha and omega-diene.

[0011] In other modes of this invention, the solvent of the addition to a silicone elastomer is added, and a solvent and a silicone elastomer are sheared until a silicone paste is formed.

[0012] As further mode of this invention, water is added to a silicone paste, and water and a silicone paste are sheared until a silicone emulsion is formed. This silicone emulsion is formed under [of a surfactant] absent.

[0013] The silicone elastomer, silicone paste, and silicone emulsion which are prepared according to these approaches have special value and usefulness in processing the bottom of the hair of the body, the skin, or SiH . Furthermore, this silicone elastomer, a silicone paste, and a silicone emulsion can form a barrier film after the solvent of arbitration, or evaporation of a volatile component.

[0014] The various processes carried out according to the approach of this invention and this invention can be explained with reference to the following procedure.

Process 1: Installation of a polyether [0015]

[Formula 3]

$\equiv \text{SiH}$ シロキサン + モノアルケニルポリエーテル + 白金触媒

→ ポリエーテル基を有する $\equiv \text{SiH}$ シロキサン

[0016] Process 2: Gelation [0017]

[Formula 4]

ポリエーテル基を有する $\equiv \text{SiH}$ シロキサン + $\equiv \text{SiH}$ シロキサン

(任意) + α , ω -ジエン + 低分子量シロキサン流体 + 白金触媒

→ ゲル (エラストマー)

[0018] Process 3: A shear and swelling [0019]

[Formula 5]

ゲル/エラストマー + 低分子量シロキサン流体 → ペースト

[0020] Process 4: Emulsification [0021]

[Formula 6]

シリコーンペースト + 水 + 剪断 → シリコーンエマルジョン

[0022] In the process 1, the mole ratio of a polyether to SiH in SiH siloxane should be between 0-1.

[0023] In a process 2, although the weight ratios of a low-molecular-weight siloxane fluid to the weight of SiH siloxane and alpha which have a polyether radical, and omega-diene can be 1-98, it is 3-10 preferably. Although the mole ratios of SiH siloxane and alpha which have a polyether radical, and omega-diene can be 20:1 - 1:20, it is 1:1 preferably. Although a process 2 may contain the mixture of various compounds, at least one sort of SiH content siloxanes must contain the polyether radical.

[0024] That it is [as opposed to / especially / a process 2] suitable for example, one found-out compound The following compound : $\text{Me}_3\text{SiO}(\text{Me}_2\text{SiO})_{50}[\text{MeQSiO}]_4$ 5 (MeHSiO) SiMe_3 , It is a compound containing $\text{HSiMe}_2\text{O}(\text{Me}_2\text{SiO})_{10}\text{SiHMe}_2$ and $\text{Me}_3\text{SiO}(\text{Me}_2\text{SiO})_8$ 4 (Me_2HSiO) SiMe_3 , 1, and 5-hexadiene and decamethyl cyclopentasiloxane. In these formulas, Me is methyl and Q is $-\text{CH}_2\text{CH}_2\text{CH}_2\text{O}(\text{CH}_2\text{CH}_2\text{O})_n\text{H}$.

[0025] In the process 3, the silicone paste should contain 80 - 98% of the weight of a low-molecular-weight siloxane fluid, other fluids which should be thickened, or a solvent.

[0026] In a process 4, the weight ratios of water to said silicone paste can be 95:5-5:95.

[0027] SiH content polysiloxane A1 A mold and formula: $\text{R}_3\text{SiO}(\text{R}'_2\text{SiO})_a\text{bSiR}(\text{R}''\text{HSiO})_3$ to quote The compound or A2 expressed by compound and formula: $\text{HR}_2\text{SiO}(\text{R}'_2\text{SiO})_c\text{SiR}_2\text{H}$ expressed It is represented with the compound expressed by a mold and formula: $\text{HR}_2\text{SiO}(\text{R}'_2\text{SiO})_a\text{bSiR}(\text{R}''\text{HSiO})_2\text{H}$ to quote. It sets at these three ceremony and they are R and R'.

And R'' is the alkyl group of the carbon atomic numbers 1-6, a is the value of 0-250, b is the value of 1-250, and c is the value of 0-250. compound A 1 And A2 Mole-ratio A2:A1 0-20 — it is 0-5 preferably. It sets in a desirable mode and is A1. A mold and A2 It is A1 although the compound of a mold is used for the reaction concerned. It can react with the sufficient result only using the compound of a mold.

[0028] A1 **SiH content polysiloxane of a mold may also contain the alkyl hydrogen cyclosiloxane or the alkyl hydrogen dialkyl cyclosiloxane copolymer expressed by formula: (R'²SiO) a b (R''HSiO) (R', R'', and a and b are as the above-mentioned definition among a formula.). Preferably, a is the value of 0-7 and b is the value of 3-10. some typical compounds — 4 (OSiMeH), 3 (OSiMeH) (OSiMeC six H13), and 2 (OSiMeH) — 2 (OSiMeC six H13) and (OSiMeH) (OSiMeC six H13) 3 (Me is -CH₃ among a formula.)

[0029] The most desirable unsaturated hydrocarbon is alpha and omega-diene which are expressed by formula: CH₂=CH(CH₂)_x CH=CH₂ (x are 1-20 among a formula.). Some examples of representation of alpha suitable for using it in this invention and omega-diene are 1, 4-pentadiene, 1, 5-hexadiene, 1, 6-heptadiene, 1, 7-OKUTA diene, 1, 8-nonadiene, 1, 9-deca diene, 1, and 11-dodeca diene, 1, 13-tetra-deca diene and 1, and 19-eicosa diene.

[0030] However, other unsaturated hydrocarbon like alpha expressed by alpha [which is expressed by formula: CH**C(CH₂)_x C**CH (x are 1-20 among a formula.)], omega-gene, or formula: CH₂=CH(CH₂)_x C**CH (x are 1-20 among a formula.) and omega-en-Inn can be used. Some examples of representation of alpha suitable for using it in this invention and omega-gene are 1 and 3-Buta Jean HC**C-C**CH and 1, and 5-hexa gene (dipropargyl) HC**C-CH₂ CH₂-C**CH. One example of representation of alpha and omega-en-Inn suitable for using it in this invention is hexene-5-Inn -1 and CH₂=CHCH₂ CH₂ C**CH.

[0031] The reaction in processes 1 and 2 needs the catalyst which triggers the reaction between **SiH content siloxane, a mono-alkenyl polyether and alpha, and omega-diene. a suitable catalyst — the — they are VIII group transition metals, i.e., noble metals. Such a precious metal catalyst is indicated by the U.S. Pat. No. 3,923,705 specification. A certain desirable platinum catalyst is a callus TETTO (Karstedt) catalyst indicated by U.S. Pat. No. 3,715,334 and the No. 3,814,730 specification. A callus TETTO catalyst is a platinum divinyl tetramethyl disiloxane complex which was dissolved into the poly dimethylsiloxane fluid or a solvent like toluene and which contains about 1% of the weight of platinum typically. The specific catalyst used in the following example was a callus TETTO catalyst of 20microl and 200microl as 1% of the weight of platinum dissolved into the poly dimethylsiloxane fluid of 2 centistokes (mm²/s). Other desirable platinum catalysts are the resultants of the platinic chloride indicated by the U.S. Pat. No. 3,419,593 specification and the organic silicon compound containing an end aliphatic series partial saturation radical. this precious metal catalyst — per **SiH content polysiloxane 100 weight section — it is most preferably used in the amount of the 0.00001 to 0.002 section the 0.00001 to 0.02 section the 0.00001 to 0.5 section.

[0032] said mono-alkenyl polyether — formula: — it is the compound expressed by compound or formula: CH₂=CH-Q-O(CH₂ CH₂ O)_y z T (CH₂ CH₃ CHO) expressed by CH₂=CH(CH₂)_x O (CH₂CH₂ O)_y z T (CH₂ CH₃ CHO). T expresses the end group which can be aryl group; or acetyl like hydrogen; methyl, ethyl, propyl, butyl, and C1 -C10 alkyl-group; phenyl like DESHIRU, a propionyl, the butyryl, lauroyl one, myristoyl, and C1 - C20 acyl group like stearoyl among these formulas. Q is a bivalence connection radical containing a partial saturation radical like phenylene-C₆ H₄-. The values of x are 1-6, and y is the value of 0, or 1-100, and z is the value of 0, or 1-100, and it is contingent [on both y and z being 0].

[0033] said low-molecular-weight siloxane fluid — (i) volatile low molecular weight — the low molecular weight of a line or an annular methyl siloxane, (ii) volatility, or a non-volatile — a line, annular alkyl, or an aryl siloxane — or (iii) They can be the line of low molecular weight, or an annular organic-functions siloxane. however, the low molecular weight of volatility [thing / most desirable] — they are a line or an annular methyl siloxane (VMS).

[0034] A VMS compound has the average unit expressed by formula: (CH₃) a SiO (4-a) / 2 (a has the average of 2-3 among a formula.). This compound includes the siloxane unit combined by **Si-O-Si** association. a typical unit — 1 "functionality M" unit (CH₃) 3 SiO 1/2 And 2

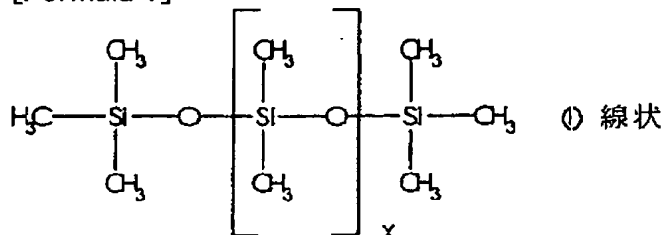
"functionality D" unit $(\text{CH}_3)_2\text{SiO}_2$ it is.

[0035] 3 "functionality T" unit CH_3SiO_3 By existence, formation of the line into which volatility branched, or an annular methyl siloxane takes place. Four functionality "Q" unit SiO_4 Formation of the line into which volatility branched by existence, or an annular methyl siloxane takes place.

[0036] a line — VMS — formula: $(\text{CH}_3)_2\text{SiO}[(\text{CH}_3)_2\text{SiO}]_y\text{Si}(\text{CH}_3)_3$ It is expressed. The values of y are 0-5. annular — VMS — formula: $[(\text{CH}_3)_2\text{SiO}]_z$ the value of z expressed — 3-8 — it is 3-6 preferably. These volatile methyl siloxanes have the viscosity of the less than 250-degree C boiling point and 0.65 to 5.0 centistokes (mm²/s) generally.

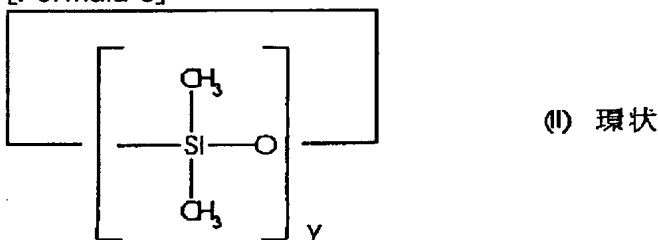
[0037] These volatile methyl siloxanes are formula: [0038].

[Formula 7]



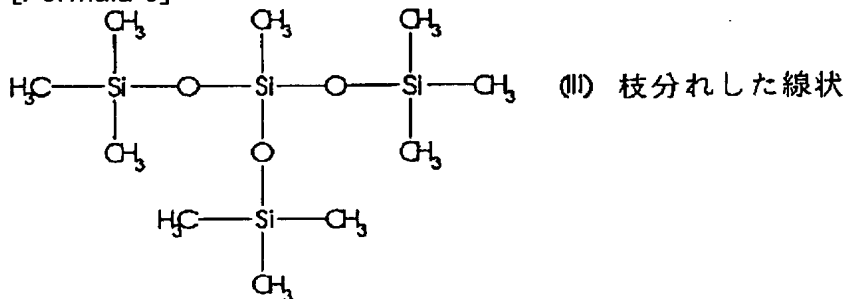
[0039]

[Formula 8]



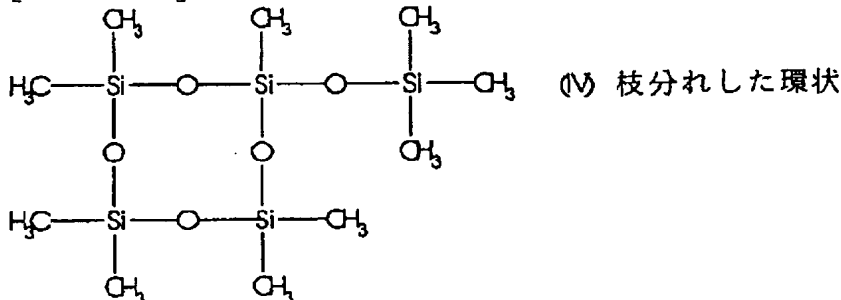
[0040]

[Formula 9]



[0041]

[Formula 10]



[0042] It can be alike and can express more.

[0043] some typical volatility — a line — a methyl siloxane (I) formula [of 100 degrees C of

boiling points, and viscosity of 0.65mm² / s]: — Me₃ SiOSiMe₃ formula:Me₃ SiOMe₂ SiOSiMe₃ of 152 degrees C of boiling points, and hexa methyl disiloxane (MM); viscosity of 1.04mm² / s expressed formula:Me₃ SiO(Me₂ SiO)₂ SiMe₃ of 194 degrees C of boiling points, and octamethyl trisiloxane (MDM); viscosity of 1.53mm² / s expressed formula:Me₃ SiO(Me₂ SiO)₃ SiMe₃ of 229 degrees C of boiling points, and decamethyl tetra-siloxane (MD₂ M); viscosity of 2.06mm² / s expressed formula:Me₃ SiO(Me₂ SiO)₄ SiMe₃ of 245 degrees C of boiling points, and dodeca methyl pentasiloxane (MD₃ M); viscosity of 2.63mm² / s expressed Tetra-decamethyl hexa siloxane (MD₄ M); expressed and 270 degrees C of boiling points, and formula:Me₃ SiO(Me₂ SiO)₅ SiMe₃ of viscosity of 3.24mm² / s It is the hexa decamethyl hepta-siloxane (MD₅ M) expressed.

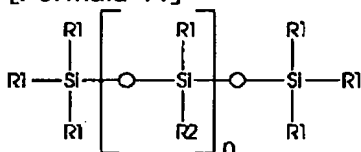
[0044] Some typical volatile annular methyl siloxanes (II) formula [of 134 degrees C of boiling points]: — 3 (Me₂) Formula: (Me₂) SiO₄ of 176 degrees C of boiling points, and hexa methyl cyclotrisiloxane (D3); viscosity of 2.3mm² / s expressed formula: ((Me₂) SiO)₅ of 210 degrees C of boiling points, and octamethylcyclotetrasiloxane (D4); viscosity of 3.87mm² / s expressed Decamethyl cyclopentasiloxane (D5); expressed and 245 degrees C of boiling points, the formula of viscosity of 6.62mm² / s: It is the dodeca methyl cyclohexa siloxane (D6) expressed by 6 (Me₂).

[0045] Methyl siloxane into which some typical volatility branched (III) And (IV) formula [of 192 degrees C of boiling points, and viscosity of 1.57mm² / s]: — C₁₀H₃₀O₃ Si₄ formula:C₁₂H₃₆O₄ Si₅ of 222 degrees C of boiling points, and hepta-methyl-3-[(trimethylsilyl) oxy-] trisiloxane (M3 T); viscosity of 2.86mm² / s expressed The hexa methyl -3, 3-screw [(trimethylsilyl) oxy-one] trisiloxane (M4 Q);, and formula:C₈ H₂₄O₄ Si₄ which are expressed It is the pentamethyl [(trimethylsilyl) oxy-ones] cyclotrisiloxane (MD3) expressed.

[0046] the approach of this invention — the low molecular weight of volatility or a non-volatile — it includes using a line or annular alkyl, and an aryl siloxane. a typical line — a siloxane — formula: — $R_3SiO(R_2SiO)_ySiR_3$ the compound expressed — it is — typical cyclosiloxane — formula: $(R_2SiO)_z$ It is the compound expressed. R is the alkyl group of the carbon atomic numbers 2–6, or an aryl group like phenyl. the value of y — 0–80 — it is 0–20 preferably. the value of z — 0–9 — it is 4–6 preferably. These siloxanes have the viscosity of about one to 100 centistokes (mm²/s) within the limits generally.

[0047] The low-molecular-weight siloxane of other typical non-volatiles is general structure-expression: [0048].

[Formula 11]



[0049] (— n is a value which provides the polymer concerned with the viscosity of about 100 to 1,000 centistokes (mm²/s) within the limits among a formula.) — it is expressed.

[0050] R1 and R2 are the alkyl group of the carbon atomic numbers 2–20, an aryl group like phenyl, or a functional group among said formula. Typically, the value of n is about 80–375. As a concrete siloxane, there are the poly diethyl siloxane, the poly methylethyl siloxane, a poly methylphenyl siloxane, and a poly diphenyl siloxane.

[0051] A low-molecular-weight organic-functions siloxane can show a type by an acrylamide organic-functions siloxane fluid, an acrylate organic-functions siloxane fluid, an amide organic-functions siloxane fluid, an amino organic-functions siloxane fluid, a carbinol organic-functions siloxane fluid, a carboxy organic-functions siloxane fluid, a chloro alkyl organic-functions siloxane fluid, an epoxy organic-functions siloxane fluid, a glycol organic-functions siloxane fluid, a ketal organic-functions siloxane fluid, the mercapto organic-functions siloxane fluid, the methyl ester organic-functions siloxane fluid, the perfluoro-organic-functions siloxane fluid, and the silanol organic-functions siloxane.

[0052] This invention is not limited to making a silicone elastomer swell with a low-molecular-

weight siloxane fluid. The silicone elastomer concerned can be made to swell using the solvent of other classes, and you may be the mixture of a single solvent or a solvent.

[0053] Therefore, a solvent is (i) here. An organic compound and compound containing (ii) silicon atom (iii), The mixture of an organic compound, the mixture of the compound containing (iv) silicon atom, or (v) The mixture of an organic compound and the compound containing a silicon atom is meant. This definition means that these compounds are used on a scale of industrial, in order to dissolve other ingredients, and to make it suspend or to change the physical characteristic of other ingredients.

[0054] Generally, as for said organic compound, aromatic hydrocarbon, aliphatic hydrocarbon, alcohol, an aldehyde, a ketone, an amine, ester, the ether, a glycol, glycol ether, alkyl halide, or a halogenated-aromatics compound is contained. Some typical things of a more common organic solvent A methanol, ethanol, 1-propanol, a cyclohexanol, Benzyl alcohol, 2-octanol, ethylene glycol, propylene glycol, and alcohol like glycerol; A pentane, A hexane, a cyclohexane, a heptane, the object for varnish manufacture, and the solvent for coatings (naphtha), And aliphatic hydrocarbon like a mineral spirit; Chloroform, Alkyl halide like a carbon tetrachloride, pel chloroethylene, an ethyl chloride, and a chlorobenzene; Isopropylamine, Cyclohexylamine, ethanolamine, and an amine like diethanolamine; Benzene, Toluene, ethylbenzene, and aromatic hydrocarbon like a xylene; Ethyl acetate, Isopropyl acetate, ethyl acetoacetate, amyl acetate, Ester like isobutyl iso butyrate and benzyl acetate; Ethyl ether, The ether like n-butyl ether, a tetrahydrofuran, and 1,4-dioxane; Ethylene glycol monomethyl ether, A glycol like ethylene glycol monomethyl ether acetate, the diethylene-glycol monobutyl ether, and the propylene glycol monophenyl ether; An acetone, A methyl ethyl ketone, a cyclohexanone, diacetone alcohol, methyl amyl ketone, and a ketone like diisobutyl ketone; Mineral oil, A petroleum hydrocarbon like a gasoline, naphtha, kerosine, gas oil, a fuel oil, and a crude oil; Lubricating oil; like spindle oil (spindle oil) and turbine oil (turbine oil), and corn oil, They can be soybean oil, olive oil, rapeseed oil, cotton seed oil, sardine oil, a herring oil, and fatty oil like whale oil.

[0055] Other various organic solvents like an acetonitrile, nitromethane, dimethylformamide, propylene oxide, trioctylphosphate, a butyrolactone, a furfural, pine oil, TAPENTAIN, and m-creosol can be used.

[0056] "Solvent" Here furthermore, the becoming vocabulary wintergreen oil; — peppermint oil; — spearmint oil; — menthol; — vanilla bean oil; — cinnamon oil; — clove oil; — bay oil (bayoil); — aniseed oil; — eucalyptus-oil; — thyme-oil (thyme oil); — a SEDA leaf oil () [cedar] leaf oil; nutmeg oil; The SAGE, cassia, cacao, the oil; quantity fructose corn syrup; lemon of liquorice, The oil of Orange, a lime, and citrus group vegetation like a grapefruit; An apple, Fruit essence; and cinnamyl acetate like a pear, a peach, a grape, a strawberry, a bramble, a cherry, a plum, a pineapple, and an apricot, A cinnamaldehyde, OIGE nil formate, p-methyl anisole, An acetaldehyde, a benzaldehyde, anisaldehyde, a citral, An volatile flavoring like other useful seasonings which include the aldehyde and ester like nerol, decanal ** vanillin, tolyl aldehyde, 2, and 6-dimethyl octanal and 2-ethyl butyraldehyde is shown.

[0057] Furthermore, a natural product and an volatile aromatic like perfumed oil are contained in the vocabulary "solvent" Becoming. As some typical natural products and perfumed oil Umber grease, a benzoin, a civet, a clove, a leaf oil (leaf oil), A jasmine, MATE (mate), MIMOSA (mimosa), musk, Myrrh resin (myrrh), an iris oil, sandalwood oil, and Oleum Vetiveris; Amyl salicylate, An amyl SHINNAMIN aldehyde, benzyl acetate, citronellol, Fragrance chemical; and the bouquet (floral bouquet) system like a coumarin, a geraniol, isobornyl acetate, Anh Brett, and TERUPI nil acetate, There is perfumed oil of various classic networks like an Oriental system, a sandalwood system, a woody system, a citrus system, a canoe (canoe) system, a leather system, a speiss system, and a herb system.

[0058] The approach of this invention is gradually enforced by mixing combining **SiH content siloxane, a mono-alkenyl polyether, alpha, omega-diene, a low-molecular-weight siloxane or a solvent, and a platinum catalyst and these components at a room temperature until gel, an elastomer, a paste, or an emulsion is formed. If it is a request, it can dilute further with the congener or the solvent of a different kind of gel, an elastomer, a paste, or addition of an emulsion, and an end product can be formed. The compound of a hexane and a tetrahydrofuran,

an aromatic, an oil, or other low-molecular-weight siloxanes are the examples of the diluent which can be used. Since the approach concerned is accelerated, high temperature can be used. [0059] The low-molecular-weight siloxane or solvent of the amount of additions is added to gel. That is, shearing force is applied to the mixture subsequently obtained in addition in the process 3 in the low-molecular-weight siloxane or solvent of the amount of additions, and a paste is made to form. In a process 4, after adding water in order to form an emulsion while adding water to said paste or, shearing force is used again. In order to carry out these processes, mixing and shear equipment of the class of a batch mixer, a planet form mixer, one shaft or a multiaxial screw extruder, and dynamic or arbitration like a static mixer, a colloid mill, a homogenizer, SONORETA, or such combination may be used.

[0060] Typically, the approach of this invention is enforced using SiH content siloxane in which a mole ratio has the polyether radical of about 1:1 and α , and ω -diene. Although it is predicted that a useful ingredient can be prepared also by enforcing the approach of this invention, using SiH content siloxane or α , and ω -diene superfluously, it will be considered that the raw material is not used not much effectively. the remainder of the constituent concerned — the constituent concerned — it consists of the low-molecular-weight siloxane or solvent of an amount of 80 – 98% of the weight of within the limits preferably 65 to 98% of the weight generally. The following examples explain this invention to a detail more.

[0061]

[Example]

It is in example the round bottom flask of 13 lots, and is average structure-expression: $\text{Me}_3\text{SiO}(\text{Me}_2\text{SiO})_{93}(\text{MeHSiO})_6\text{SiMe}_3$. Organopolysiloxane [100g and 6.07g] $\text{CH}_2=\text{CHCH}_2\text{O}(\text{CH}_2\text{CH}_2\text{O})_7\text{H}$ expressed was mixed with 100g 2-propanol. The callus TETTO catalyst (1% of the weight of platinum is included in the poly dimethylsiloxane fluid of 2 centistokes (mm^2/s)) of 200microl was added to this solution. This solution was stirred, and it heated in order to keep this solution at about 70 degrees C. 1 hour after, it connected with the vacuum pump, said three-lot flask was exhausted, and 2-propanol was removed. Polyether branching SiH SHIROKISAMPORIMA was obtained with almost quantitative yield.

[0062] 1 and 5-hexadiene (said 16g polyether branching SiH SHIROKISAMPORIMA and 0.411g) was mixed with 65.64g decamethyl cyclopentasiloxane within the reaction container. The callus TETTO catalyst of 20microl was added stirring a solution. Gelation occurred within several hours. Before making the gel of 50 weight sections swell by the decamethyl cyclopentasiloxane of 50 weight sections under shearing force, gel was left in the reactor overnight. The homogeneous paste which has the viscosity of 1.82×10^6 cP/mPa-s by shear rate 0.02s^{-1} was obtained.

[0063] When this homogeneous paste and deionized water were mixed with the mechanical agitator within the glass jar by the weight ratio 1:1, the white emulsion which has the outstanding aesthetic appearance and stability was formed. A surfactant was not needed for forming this emulsion.

[0064] It is in example the round bottom flask of 23 lots, and is average structure-expression: $\text{Me}_3\text{SiO}(\text{Me}_2\text{SiO})_{108}10(\text{MeHSiO})\text{SiMe}_3$. Organopolysiloxane [100g and 12.42g] $\text{CH}_2=\text{CHCH}_2\text{O}(\text{CH}_2\text{CH}_2\text{O})_{10}(\text{CH}(\text{CH}_3)\text{CH}_2\text{O})_4\text{H}$ expressed was mixed with 100g 2-propanol. The callus TETTO catalyst of 200microl was added to this solution. This solution was stirred, and it heated in order to keep this solution at about 70 degrees C. 1 hour after, it connected with the vacuum pump, said three-lot flask was exhausted, and 2-propanol was removed. Polyether branching SiH SHIROKISAMPORIMA was obtained with almost quantitative yield.

[0065] 1 and 9-deca (said polyether branching SiH 12g SHIROKISAMPORIMA and 0.72g) diene was mixed with 65.64g decamethyl cyclopentasiloxane within the reaction container. The callus TETTO catalyst of 20microl was added stirring a solution. Gelation occurred within several hours. Before making the gel of 50 weight sections swell by the decamethyl cyclopentasiloxane of 26 weight sections under shearing force, gel was left in the reactor overnight. The homogeneous paste which has the viscosity of 2.66×10^6 cP/mPa-s by shear rate 0.02s^{-1} was obtained.

[0066] When this homogeneous paste and deionized water were mixed with the mechanical agitator within the glass jar by the weight ratio 1:1, the white emulsion which has the outstanding

aesthetic appearance and stability was formed. This emulsion had the viscosity of 4.93×10^6 cP/mPa-s by shear rate 0.02 s^{-1} . Again, a surfactant was not needed for forming this emulsion. [0067] It is in example the round bottom flask of 33 lots, and is average structure-expression: $\text{Me}_3 \text{SiO}(\text{Me}_2 \text{SiO})_{93}(\text{MeHSiO})_6 \text{SiMe}_3$. Organopolysiloxane [100g and 7.99g] $\text{CH}_2 = \text{CHCH}_2 \text{O}(\text{CH}_2 \text{CH}_2 \text{O})_7 \text{H}$ expressed was mixed with 100g 2-propanol. The callus TETTO catalyst of 200microl was added to this solution. This solution was stirred, and it heated in order to keep this solution at about 70 degrees C. 1 hour after, it connected with the vacuum pump, said three-lot flask was exhausted, and 2-propanol was removed. Polyether branching **SiH SHIROKISAMPORIMA was obtained with almost quantitative yield.

[0068] They are said 12g polyether branching **SiH SHIROKISAMPORIMA and average structure-expression: $\text{Me}_3 \text{SiO}(\text{Me}_2 \text{SiO})_{16}(\text{MeHSiO})_{39} \text{SiMe}_3$ within a reaction container. 1 and 5-hexadiene (the siloxane expressed and 0.925g) was mixed with 84.8g decamethyl cyclopentasiloxane. The callus TETTO catalyst of 20microl was added stirring a solution. Gelation occurred within several hours. Before making the gel of 75 weight sections swell by the decamethyl cyclopentasiloxane of 26 weight sections under shearing force, gel was left in the reactor overnight. The homogeneous paste which has the viscosity of 6.6×10^5 cP/mPa-s by shear rate 0.02 s^{-1} was obtained.

[0069] When this homogeneous paste and deionized water were mixed with the mechanical agitator within the glass jar by the weight ratio 1:1, the white emulsion which has the outstanding aesthetic appearance and stability was formed. This emulsion had the viscosity of 2.7×10^6 cP/mPa-s by shear rate 0.02 s^{-1} . Again, a surfactant was not needed for forming this emulsion.

[0070] The following examples are examples of the alternative mode of the process 2 shown previously, and **SiH siloxane of "arbitration" is contained as a constituent in this example.

[0071] The rate and procedure in example of example of example 4-the 1st comparison 1 are used, and it is **SiH content siloxane $\text{Me}_3 \text{SiO}(\text{Me}_2 \text{SiO})_{93}(\text{MeHSiO})_6 \text{SiMe}_3$ in decamethyl cyclopentasiloxane. The bridge was made to construct with 1 and 5-hexadiene. Gel is formed and the degree was made to swell this gel by additional decamethyl cyclopentasiloxane. Consequently, the smooth transparence paste was formed. However, water was not able to be distributed when a paste was mixed with water. This example shows the effectiveness of eliminating a mono-alkenyl organic-functions polyether.

[0072] The procedure in example of example of example 5-the 2nd comparison 1 is used, and it is 100g $\text{Me}_3 \text{SiO}(\text{Me}_2 \text{SiO})_{93}(\text{MeHSiO})_6 \text{SiMe}_3$. And polyether branching **SiH content SHIROKISAMPORIMA was prepared from 6.07g $\text{CH}_2 = \text{CHCH}_2 \text{O}(\text{CH}_2 \text{CH}_2 \text{O})_7 \text{H}$. Next, said 1g branching polyether branching **SiH content SHIROKISAMPORIMA, 10g decamethyl cyclopentasiloxane, and 11g deionized water were mixed. It seemed that mixture seemed to have emulsified and the milk-like emulsion was formed during intense mixing which uses a mechanical agitator. However, the emulsion was divided into two phases in about 2 hours. This shows the effectiveness of eliminating the crosslinking reaction by alpha and omega-diene.

[0073] The silicone elastomer, the silicone gel, silicone paste, and silicone emulsion of this invention have special value in the personal care field. For volatility with the peculiar VMS component of these constituents, even if these constituents are used by these very thing, or in order to form the various personal care products of a medical practitioner's formula needlessness (OTC), they may be used for other fluids for cosmetics, blending them.

[0074] For example, in order that the constituent of this invention may leave dry tactile feeling and may not cool the skin at the time of evaporation, it is useful as a carrier in a sweating inhibitor and a deodorant. The constituent of this invention Skin cream, a skin care lotion, a humidification agent, An acne remover (acne remover) or a face processing agent like a wrinkling picking agent (facial treatment), Personal cleanser or face cleanser, bus oil (bath oil), A perfume, a colon, SASSHIE (sachet), a sunscreen agent, a pre-shave lotion (pre-shave lotion), and an aftershave lotion (after-shave lotion), The property of the soapsuds (shavinglather) for liquid soap, the soap for razors, and razors is improved. Gloss is raised, the drying time is shortened, and in order to offer the advantage which carries out conditioning, the constituent of this invention can be used all over a hair shampoo, hair conditioner, hair spray, a mousse (mousse), a permanent agent (permanent), a depilatory, and a cuticle coat.

[0075] In cosmetics, the constituent of this invention acts as makeup cosmetics, colored cosmetics (color-cosmetic), foundation, *****, a lip stick, a lip balm agent (lip balm), an eyeliner, mascara, an oil remover, a colored cosmetics remover, the ** exhibition agent for the pigments in powder, and a spreader. The constituent of this invention is useful as a delivery system for oil solubility like a vitamin, and the water-soluble matter. When the constituent of this invention is included in a stick (stick), gel, a lotion, aerosol, and rollon (roll-on), the constituent of this invention gives dry smoothness like silk.

[0076] Furthermore, the constituent of this invention shows other advantages and useful properties like transparency, shelf life, and the ease of carrying out of manufacture. So, the application of the constituent of this invention is large and it has especially an application as a carrier in a sweating inhibitor, a deodorant, and a perfume, and the application which carries out conditioning of the hair.

[0077] The silicone elastomer, the gel, paste, and emulsion of this invention are except the personal care field, and have an application including using them as an alternative of the barrier by which on-site formation is carried out to a soil-water interface for the filler for cables or an insulating material, and on-site ground stabilization (inch situ ground stabilization), or the epoxy ingredient currently used in electronic industry.

[0078] The silicone elastomer, the gel, paste, and emulsion of this invention are useful also as a carrier for silicone rubber particles who constructed the bridge. It sets for this application and is (i). The silicone elastomer, the gel, paste, and emulsion of this invention make a particle easy to introduce into silicone like a sealant, paint, coating, grease, adhesives, a defoaming agent, and a **** ingredient, or an organic phase, and the silicone elastomer, the gel, paste, and emulsion of (ii) this invention improve such a rheology-property of a phase, a physical property, or endergonic in neatness or the condition of having been finished.

[0079] Furthermore, the silicone elastomer, the gel, paste, and emulsion of this invention can act as an activity carrier for matter biologically [drugs, a biocide, a herbicide, agricultural chemicals and others], and can use the silicone elastomer, the gel, paste, and emulsion of this invention for introducing water and the water-soluble matter into a hydrophobic system. There are a salicylic acid, glycerol, an enzyme, and a glycolic acid in the example of some water-soluble matter.

[0080] When a barrier film is needed, it can apply on the surface of a base material so that a solvent or a low-molecular-weight siloxane may evaporate the silicone elastomer, the gel, paste, and emulsion of this invention and it may leave the film of a fines-like particle to a base material front face.

[0081] Other modification can be added to the compound, constituent, and approach which were indicated on these specifications, without deviating from the fundamental mode of this invention. The gestalt of this invention indicated on these specifications is a thing only for instantiation, and does not limit the range of this invention specified to a claim.

[Translation done.]